97-84001-14

Wait, William Bell

The uniform type question

[New York]

1915

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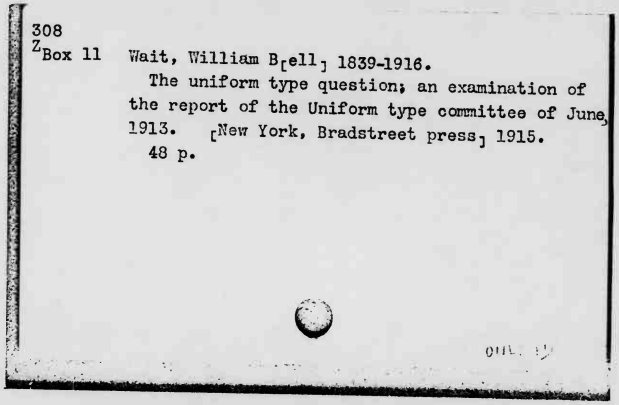

308
Z Box 11 Wait, William B[ell] 1839-1916.
The uniform type question; an examination of the report of the Uniform type committee of June, 1913. [New York, Bradstreet press, 1915.
48 p.

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TECHNICAL MICROFORM DATA

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DATE FILMED: 1-13-97 INITIALS: PB.

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MAIN ENTRY: Wait, William Bell

The uniform type question

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THE UNIFORM TYPE QUESTION

AN EXAMINATION OF THE
REPORT OF THE UNIFORM TYPE COMMITTEE
OF JUNE, 1913

By WILLIAM B. WAIT

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THE BRADSTREET PRESS,
143 LAFAYETTE ST., N. Y

13 Sept. 1915. MS

AN EXAMINATION OF THE REPORT OF THE UNIFORM TYPE COMMITTEE OF JUNE, 1913.

By William B. Wait.

The first book with raised letters for reading by touch was published in France in 1784 by Valentin Hauy. The type was modeled after the forms of the Roman lower case—no capitals being used.

About 1820 Charles Barbier devised a system of writing and printing by raised points for the purpose of reading by touch.

Thus it will be seen that at an early stage two varieties of type designed for touch reading were introduced after much study and experiment by two highly intelligent men—both of whom could see.

From time to time other schemes of tactile type have been suggested, but in the end the types based on the forms of the Roman letters and those formed of raised points are the only ones that have persisted and survived.

The principal type schemes under these two heads are these:

France, lower case Roman, nonrecurrent, no capitals, 1784, by Valentin Hauy; Edinburgh, lower case Roman, nonrecurrent, no capitals, 1831, by James Gall; Glasgow, upper case Roman, nonrecurrent, no capitals, 1834, by Edmund Fry and Rev. John Alston (blind); France, vertical, six level point, phonetic, nonrecurrent, no capitals, 1820, by Charles Barbier; France, vertical, trilevel point, nonrecurrent, no capitals, irregular intervals, 1829, by Louis Braille (blind); England, modified Roman, nonrecurrent, no capitals, 1825, by William Moon (blind); Boston, lower case Roman, nonrecurrent, no capitals, 1832, by Samuel G. Howe; New York City, bilevel, recurrent, capitals and lower case, six bases, regular intervals,

1866, by William B. Wait; English Braille, the original trilevel, nonrecurrent alphabet of Louis Braille, appropriated bodily by the British and Foreign Blind Association, supplemented by a large list of abbreviations, and now called British Braille, 1870; United States, American Braille, trilevel point, lower case, recurrent, no capitals, irregular intervals, 1884, by John Smith (blind), Edward E. Allen, John T. Sibley and J. H. Johnson; England, London Point System, trilevel, recurrent, regular intervals, four bases, capitals, if any, from New York Point, 1894, by Rev. J. Knowles.

Here let it be noted that while all the type suggested by blind men followed Roman forms, the inventor of point type having no relation to Roman forms, was a seeing man, Charles Barbier.

These references are very instructive; for instance, they show the mental attitude of highly intelligent men—both seeing and blind. It appears also that all progressive ideas and designs have been the result of individual interest and initiative.

In considering the question of the wisdom of adopting, or even of commending and patronizing at this time, any other system that is of the same species as any of those before named, there are some facts which ought to be in mind, but of which the general reader would know nothing unless they are pointed out.

When these systems, except British Braille, American Braille and the London Point System, were proposed, the field in every country was open and unworked; they appeared one after the other at wide intervals of both time and space; funds were wanting; then, as now, little was known about the subject, the interest in which was very limited and purely local; there was no embossed literature or music and no means of tangible writing.

But however unwarranted and injudicious the introduction of the systems now extant may have been, whatever may be their defects, intrinsic merits or relative value, the impressive fact remains that the entire embossed literature and music of

the world, comprising the means of education, of religious instruction, of intellectual refreshment and comfort of the blind everywhere (having taken 134 years of time, the patient, intelligent and often gratuitous service of many devoted men and women and an outlay of not less than two millions of dollars), exist in these systems.

About 1890 an agitation was begun having for its object the adoption of a single type upon the assumption that the existing diversity of types should give way to a single uniform type, to be chosen by a select committee of blind people; and accordingly, in 1905, at the Saginaw meeting of the American Association of Workers for the Blind, a committee, called the Uniform Type Committee, was appointed, whose duty was "To investigate the various forms of tactile print, and to labor for the adoption of some one universal system."

For several years the committee worked industriously but made no progress towards a satisfactory solution of the problem, and the Association of Workers then devised a new plan, at once simple, unique and which on its face promised a sure solution. Briefly stated, the main features of the plan were these:

1. The questions to be settled.
2. The preparation by this committee of a series of test papers embossed in the systems under examination.
3. The test papers to be read by readers of different systems under the sole direction of a member of the committee styled the "Agent."
4. The determining facts developed by these reading tests to be the average of the elapsed time and errors made by the readers of each system.

The report of the committee, which shows remarkable astuteness, versatility and ingenuity in the execution of this work, was submitted to the Workers at their meeting in Jacksonville, Ill., in June, 1913, and was approved and adopted by that body.

The final and essential result is expressed in the following Resolutions which form part of the report and were adopted with it:

"BE IT RESOLVED: That we recommend to the American Association of Workers for the Blind:

1. That the Association adopt, for itself officially and individually, and take all measures practicable to secure the adoption by publishing houses, educational institutions, libraries, etc., for the blind, in this country and abroad, of:

   (*a*) The British Braille alphabet and the American Braille capital prefix, with such modifications, if any, as shall be in accordance with the findings of your committee, and that the development of the complete system be in harmony with the principles of three-level, variable-base and frequency of recurrence, the system to be known as the Standard Dot System.

   (*b*) That the dimensions of the characters in this system shall exceed a minimum of eighty thousandths of an inch from center to center of dots, both vertically and horizontally.

2. That experiments and tests shall be made in diacritical, musical, mathematical and other scientific notations, including third and fourth base characters, and in scale of type, and that the ultimate results of such investigations shall be incorporated as a part of the Standard Dot System, this work to be conducted under the direction of the Uniform Type Committee."

Now this procedure is a most serious matter, for it means the interference of a self-appointed, unrepresentative, unincorporated, unsupervised body in the affairs of other organizations and people; means the diversion of funds, facilities, experience and the destruction of established interests; means a disregard, and it may be a violation, of the obligations of duty and loyal service; means that while one is serving as an officer, a teacher or employee, he will individually carry out the purposes of the Workers Association and in doing so will, if practicable, use the premises and facilities that are being provided by his employer; means that the time and attention of pupils will be diverted from use of present methods and facilities already provided, and will be given to the propaganda of a system which, as yet, no one has seen, but to which the Workers have, in advance, pledged themselves.

Inasmuch as this momentous action depends upon the facts developed by the reading of the test papers prepared and administered by the committee itself, it is important to know whether the elapsed time and errors made in reading the test papers was affected either favorably or adversely by the contents, arrangement and administration of the tests made by and under the direction of the committee itself, and if so, in what way and to what extent? The answers to this question will be found in the analyses of the test papers.

Before presenting these matters in detail, however, some items in the resolutions and certain facts developed in the administration of the tests deserve brief mention:

The use of the words "Standard Dot" instead of "Uniform Type," as the name of the system yet to be, doubtless caused great surprise, especially as no reason for the change was given.

The *prior existence of a trilevel system almost identical in its essential features* with the trilevel system as described in the resolutions *may account for the action.*

The following is from the title page of a pamphlet that appeared in London in 1904:

"THE
'LONDON POINT' SYSTEM
OF
READING FOR THE BLIND,
WITH
METHODS OF ABBREVIATION FOR USE WITH
THE SYSTEM,
BEING
A PROGRESSIVE SCHEME FROM SIMPLE LETTERS
TO SHORTHAND; DESIGNED FOR THE
BLIND OF ALL CLASSES.
BY THE
REV. J. KNOWLES."

This is a trilevel system and provides for signs one, two, three and four points wide, in other words, for a series

of base forms extended laterally *after the manner of New York Point*.

On page 26 of that pamphlet the following paragraph appears:

> "In New York Point four-point-wide signs are used for Capital Letters, for series of letters which may be independent words or may form part of words, such as almost, could, come, ever; and for syllables, diphthongs, triphthongs, digraphs, such as ade, ae, ance, etc. Now as London Point has two signs (upper and middle and middle and lower) for every one of the New York Point signs (besides having many more with upper and middle and lower dots), the above methods could be carried out to a far greater extent if it should be found needful or desirable."

The author of the London System evidently had a breakdown in mind, in which case he points out that recourse can be had to the resources of the New York Point system.

The most significant feature of the renunciation of the name Uniform is that it is equivalent to a confession that the blind and general public have been entertained long enough by this fallacy of uniformity and that a new delusion should be announced.

In the construction of a Point System the first question to be settled is the distance by which the points shall be separated—the aim being to bring them as close together as possible without confusion or ambiguity, and also with due regard to the mechanical considerations involved in the structure of apparatus for embossing the points on sheets of paper and of metal.

Having amply demonstrated that the points may be closer in a bilevel than in a trilevel structure and also when the finger is in motion than when it merely rests upon the points, I fixed the scale for my paper writing machine, the kleidograph, at 0.077, and at the same time the pitch for the stereograph, a machine for embossing metal plates, was fixed at 0.080. This was in 1892, and these dimensions have never been changed. These dimensions are neither inherent in nor practically applicable to any trilevel system.

Well knowing this fact, the committee adopted as its rule of practice the fallacious, misleading theory that the systems

compared must be printed on the same scale. The reader should note the fact, however, that the adherents of this dogma most sincerely believe that the term *same* scale always means the Braille scale or one that will fit its trilevel Standard Dot scheme, but never means the New York Point scale 0.080. Those whose views are not clouded by a mistaken assumption of exclusive rightness and fitness to determine questions of this sort will reject this specious theory together with its unprofessional and discreditable practice.

At the beginning of the test readings at the New York School an episode occurred having an important bearing on this matter but to which no reference is made in the report.

As the reading began I observed that the points of this embossed paper were further apart than in the standard New York Point. On calling attention to the matter, the agent admitted that such was the case, and in reply to questions, stated that the enlargement of the scale had been suggested by a member at a meeting of the subcommittee several months earlier, the alleged purpose being to make the reading of the New York Point test papers easier for adults; that no requests for the change had been received; that she knew that the Bible, Sunday School Weekly, Publications of the Xavier Society, the Ziegler Magazine, Publications of the American Printing House for the Blind and many other publications printed in standard New York Point scale of 0.080, have for many years been read by thousands of adults throughout the country; that after due consideration the suggestion to enlarge the scale was adopted and that all of the test papers in New York Point had been printed in this enlarged scale at The Perkins Institution from plates embossed upon a machine specially built for the purpose in Boston under the direction of the committee.

With the consent of the Agent, I then caused this paper—which was the First Story—to be embossed on the stereograph in normal New York Point, and a careful measurement showed that the aggregate expansion of the letters and of the letter, word and line space caused by this covert and unannounced

enlargement of the New York scale resulted in an increase of 39% in space over the normal area, and extended the aggregate length of the lines and finger travel 16%. But the time lost from these causes was not the only handicap, for the expanded space between points was unfamiliar, producing perplexity and an increase of elapsed time and errors.

The Committee was furnished with an impression from the stereograph plate, together with a typewritten copy of the story, and a protest against the use of test papers in the false scale was also filed with the Committee.

During the readings at the New York School the only lists produced, mentioned or used by the agent were in the expanded scale.

Now, if the examining Agent had been provided with "special sheets" printed in normal New York scale of 0.080 before starting out, why were they not submitted for reading at the New York school?

It also appears that the letter groups, lists of words and the story, called "special sheets," are the same in contents as the lists and the story that had already been prepared for other purposes.

The obvious intent and effect was to handicap the New York readers with the American Braille scale under a New York Point mask, and thereby automatically increase their elapsed reading time and errors at least 25 per cent. on account of increased finger travel and other resulting hindrances.

The circumstances tend to show an expectation that the enlargement of the New York scale would pass unnoticed. When, however, it was discovered, the Committee felt obliged to justify its action by adducing proof showing that the wrongful scale is more legible than the normal New York scale, and for this purpose instituted a comparison between lists printed in the enlarged scale and in the normal New York scale of 0.080, calling these "special sheets."

On page 14 the report gives the results of these tests, of which there are three: One consisting of groups of letters,

another two lists of words, the third being the First Story. The letter groups used were list No. 342 in the enlarged, or Braille, scale, and list No. 344 in the New York scale.

According to the rules governing such tests, they should be in all respects on perfectly equal terms.

An examination of list No. 342 in enlarged, or Braille, scale and of list No. 344 in normal 0.080 New York scale, called "special sheets" by the Committee, shows that each list has 42 letter groups, comprising 168 letters each, and these superficial appearances indicate that the lists are on equal terms. Scanning them separately, however, it will be seen that in the enlarged type only 9 letters are used—17 being omitted, including all the most difficult letters. The 9 letters used are of high recurrence and have few points, reducing both time and errors in Braille and in the false large scale 0.090 as against the true New York scale 0.080.

In list No. 344, New York true scale, 15 letters are used, which are 6, or 66%, more than in the list of enlarged type.

Comparing the lists with reference to the base forms of the letters, we find:

Large type, first base letters.....	34	Finger travel.....	68 points
" " second base letters....	134	" "	402 "
" " third base letters.....	0	" "	0
	168		470
Normal scale, first base letters.....	16	Finger travel.....	32 points
" " second base letters ..	57	" "	171 "
" " third base letters....	95	" "	380 "
	168		583

Thus the expert jugglery practiced in the preparation of these papers makes the finger travel of the small scale 24% greater than the finger travel of the large scale, whereas, if the distribution of first, second and third base letters were the same in the large as in the normal type, the finger run of the large type would be 12½% more than that of the normal scale, making a total difference of 36½% between the results in the report and the real fact.

On page 13 of its Report the Committee says:

> "In order to test the relative legibility of types different in size or scale, special sheets in New York Point and American Braille were prepared. The uniform scale of type used in your committee's experiment sheets is approximately .090 of an inch from center to center of dots, both vertically and horizontally, while the scale of special sheets used in this experiment is .080. This latter is a scale generally used in New York Point books. These special sheets were printed at the Xavier Publishing House for the Blind, New York City. Your committee regrets that there were so few readers of these sheets, but the preparation of the plates in this case was so delayed by circumstances over which the committee had no control as to make it impossible to secure a larger number."

On page 14, the Committee then explains the results of this test on which it relies to justify its enlargement of the New York scale:

"Table showing a comparison between the reading of sheets printed in the large scale (.090 of an inch) used by the committee throughout the other tests, and the reading of the same lists printed in a smaller scale (.080 of an inch):

NEW YORK POINT

19 READERS

List	*Letters*	*Per cent. Time*	*Per cent. Errors*
341, 342, 344	Large Type	100	100
	Small Type	107.6	113

7 READERS

Words

731	Large Type	100	100
	Small Type	111	90

15 READERS

Story

141	Large Type	100	100
	Small Type	104.3	134 "

The lists No. 342 and No. 344, printed in true New York scale for comparison with the same lists in the enlarged scale, were read by adults in other tests in which the shortest recorded reading time in each is as follows:

No. 342 ..... 79.96 seconds
No. 344 ..... 101.3 "

By referring to the table quoted above it appears that for the letter tests list No. 342 was used in the large 0.090 scale,

while the entirely different, larger and more difficult list No. 344 was used for the 0.080 or true New York scale.

It is worth while to give here lists No. 342 and No. 344 with their analyses:

LIST No. 342, FALSE SCALE 0.090:

eais	omd	rlae	isomd	soim	arle	mios	lrd	elra
dmosi	eral	esrl	siae	drlo	demid	rem	lrse	slir
iasa	adolm	oloda	sai	rils	dmo	omer	imed	
damo	laso	oremi	dis	drie	slrl	medao	mao	
msal	loms	amsid	iord	lrls	adm	erida	iro	

LIST No. 344, TRUE SCALE 0.080:

xpp	jjlax	seif	fbdo	mrcc	babd	oflj	fmri	jce
pcsp	bxxjo	mfra	fdips	cjl	bxpx	ebca	ibcf	drpe
xsfp	cmx	jobl	jbda	cife	srxpf	pjmc	loxbj	ifsx
jjm	clcp	efbd	axrp	boic	oblf	pcsr	pxxej	afj
dbmo	libc	fps	prcxx	bjaf	edmj			

NEW YORK POINT.

	List No. 342	*List No.* 344
No. of Letters	168	168
" " Points	395	519
" " Letters omitted	17	11
" " " used	9	15
" " 1st Base Letters	34	16
" " 2nd " "	134	57
" " 3rd " "	0	95
Finger Travel, 1st Base	68	32
" " 2nd "	402	171
" " 3rd "	0	380
Total Finger Travel	470	583
Excess	0	113

Excess of finger travel in No. 344 over No. 342 ..... 23%
Excess work and elapsed time in No. 344 over No. 342 from other causes 31%

Total excess in elapsed time 54%

The foregoing analyses of lists No. 342 and No. 344 disclose the reasons why "the time required and errors made in reading the small type greatly exceeded the time and errors with the large type."

The Committee made both of these lists and had exact knowledge as to the points of difference. If the intention

had been to make a fair comparison the same list would have been used for both scales, 0.080 and 0.090.

The next test of the true 0.080 and the false 0.090 scales was with a list of 80 words, which appears in two forms:

Test No. 731—in which all the words are uncapitalized.
Test No. 732—in which ⅝, or 50, of the words are capitalized.

TEST No. 732.

apple Violet Tucker Pearl hope Job Opal quit Frank save Hill upon Lily May fear Hunt Black Dresser care Quail Ash jar Fisher move Joy reach Trader vale Brown Day box Grace door Zeal tide Keen March Queen main Smith ride Usher tell Ward Young busy Ulster dust Rose yet want Kitty up Wait Snow Ruby pair North Long open Vine nail Ivy Elk good Castor envy Eagle Green Iron loan Pansy Carry hear Yellow Album Olive you Judge New

For the 0.090 large letter sheet, the uncapitalized list of 80 words No. 731, was chosen, but the table does not indicate by any identity number what form of the 80 word list was used for the small type, 0.080 scale, and this presents the matter in a very interesting phase.

By reference to page 11 of the Report it will be seen that in New York Point the Committee employed the legitimate 4th base capitals and three anomalous, unliterary means of what is incorrectly called capitalization, namely, *tt*, *th* and *x* placed before the initial small letter.

The Report nowhere used or referred to an *uncapitalized* list or sheet of 80 words printed in the small type scale 0.080, and it is therefore clear that the small type used in this test was one of these four capitalized forms referred to.

Of the 80 words used, fifty were capitalized; so that no matter which of the four forms of capitals was used, the elapsed time for reading the capitalized list was increased by reason of more work and finger travel.

For the last of these tests the story, No. 141, was used, and on page 20 of the Report it is stated that this story was printed in New York Point both with and without capitals.

In this test, as before, there existed the same strong motive for putting the 0.080 scale in second place, and accordingly the *uncapitalized* list was used for the large type 0.090 scale, and a *capitalized* list for the small type 0.080.

The Report does not show which of the four forms of capitalization was used, but in any case, there was an excess of work and of finger travel over the *uncapitalized* list.

On page 20 the Report says:

> "In tabulating the results for these readings, we have divided the readers into four classes:
> Class 1, adults who learned to read when young, including the older pupils in the schools down to the eighth grade.
> Class 2, adults who learned after fourteen years of age.
> Class 3, school pupils in the seventh grade and below, exclusive of those who had learned recently.
> Class 4, school pupils in the seventh grade and below, who were slow for special reasons, having learned recently."

Now it appears that only fifteen readers participated in this story reading test, and the choice of the number and group of the readers for the large type and small type sheets was entirely within the control of the committee.

There is nothing to show that the *uncapitalized* sheet in the large type was not read by the best class of readers, and that the small type *capitalized* list was read by slower readers from third grade.

Anything more ingeniously contrived to force the New York readers and system into second place without disclosing the disingenuous and tricky means by which it was accomplished, is impossible to conceive.

However, when the real character of these tests is exposed it is evident that they utterly fail to furnish the Committee with any justification for its unwarranted substitution of the false exaggerated scale 0.090 in place of the true New York scale 0.080.

A peculiar experience during one of the official readings at the New York school may be mentioned here, as no notice of it appears in the Report.

Occurring as it did in the execution of a plan most carefully prepared, and having an adverse effect on the New York readers only, it has marked significance.

While the reading of a list of eighty words was proceeding, a youthful reader, who had been getting on well, suddenly halted, then made an unsuccessful attempt to pronounce a word, became perplexed, made another unsuccessful attempt at pronunciation and then gave up the effort.

The next reader halted at the same place, became confused, tried without success to pronounce the word, lost time and then proceeded.

On one of the readings the watcher found an opportunity to look at the page, and it was seen that an unpronounceable group of letters had been inserted in place of a word, thus making a baffle which halted the reader and unavoidably increased both elapsed time and errors.

It should be noted that the direct loss made by the baffle was only a small part of the whole loss, for the reason that the readers were perplexed, made nervous and overcautious for fear of meeting other similar snags.

The Agent, of course, withdrew this list, at the same time saying to me that the Committee had been pressed for time and that faulty proof reading was doubtless the cause of the defective sheet.

It is fortunate that this baffle was detected, as otherwise this defective sheet would have been used throughout all subsequent readings. Whether the condition of this sheet was accidental is a question about which there may be more than one opinion.

An astonishing provision of the resolutions is the one adopting the British Braille alphabet, which involves the practical abandonment of the principle of recurrence and the almost total loss of its advantages.

The proviso that the development of the Standard Dot System shall employ the British Braille alphabet, in which recurrence practice is impossible, and at the same time be in harmony with the principle of recurrence, is absurd, and appears to have been inserted for no other purpose than to save the face of the Committee and create the impression that the Standard Dot System will exemplify the principle of recurrence to the utmost limit of its availability.

Although the test lists prepared by the Committee were designed to demonstrate certain designated subjects as capitals, level letters, contractions, etc., the report furnishes scarcely any information on these subjects, and these topical notes are introduced here to make more clear the effect of the elements contained in each of the lists analyzed.

CAPITALS.

A capital letter is one that is "larger and of different form than others of the same font;" and in New York Point the capitals conform to this definition, while their use is similar to that of visual literature. The basis of a capital is the same small letter from which, by the addition of certain points, a larger and different form is produced.

In any Braille system the formation of a series of letters of larger size and different form is impossible, so that no Braille system has, or can have, a set of capital letters. Real capitalization being impossible, the Braillists, in recent years, have adopted the practice of placing a "capital sign" before words that should begin with a capital letter. In American Braille the period sign .. serves also as the capital sign. An illustration in visual type will give the reader a clear idea of Braille practice:

.j. de .la .fontaine and .a. de .la .fosse
were noted .french writers.

In order that the reader may be better able to properly value the amount of touch development, of mental discipline and familiarity with correct literary practice, two things should be

noted, namely: that in the Braille systems the pupil has to learn only one simple sign and only one set of letters; while in New York Point the pupil learns 26 small letters and 26 capital letters, making 52, with which he becomes both mentally and tangibly familiar, against 27 signs acquired by the Braille pupils.

In Braille the reader meets only small letters, while in New York Point the reader meets two kinds of letters, and at each capitalization must choose one out of the 26 possible differentiations.

For the purpose of exploiting this subject, the Committee prepared a list of 80 words printed in each system in two forms, one uncapitalized, and the other having 50, or 5/8, of the words capitalized. This capitalized list was read by 430 readers, 84 in British Braille, 169 in American Braille and 177 in New York Point.

These alleged New York lists with the *tt*, *th* and *x* capital signs demand notice. For a short time the *th* appeared as a capital sign and was then discontinued; the letter *x* as a capital sign has appeared in a small number of books, and I know of no publication in which *tt* has been used as a capital sign.

Where and by whom these three anomalous test capital sign papers were read, the report does not show.

At the New York Institute the committee observed the reading of German text, every noun having a fourth base capital, but the report makes no mention of it.

LEVEL TEST.

It should be noted that letters may be ambiguous when used as initials after a blank space, while in the body of the text, where the position can be determined by the preceding letter or word, there will be no ambiguity.

Every word in each of the two New York lists begins with one of the six letters *a*, *e*, *f*, *t*, *n* and *u*, thus increasing the possibility of ambiguity for the New York readers to the utmost limit; while in the two Braille lists neither of the ambiguous letters *a* and *e* are used as initial letters except in

two words, thus almost wholly relieving the Braille readers from hindrance on this account.

In ordinary English these six level letters are about 34% of all letters used. The Report states that the readings indicate that these level letters *a*, *e*, *f*, *t*, *n* and *u* "are but little, if any, hindrance in reading New York Point."

ONE SIDE LETTERS.

In each Braille system five letters are formed on one side of the type, thus, American Braille a e l s t These letters have few dots but are perplexing, because *a* and *e* are equivocal while *s* is an open letter.

In making up the test lists great care has been taken to relieve the Braille readers of these inherent obstacles by reducing the number of these letters and by the position assigned to them.

OPEN LETTERS.

In Braille an open letter is one having one or two points at both upper and lower levels, and no point at the middle level. The absence of this middle point breaks the letter into an upper and lower part, either one or both of which may be missed by the finger.

The open letters are, m n p s and u and comprise about 29% of the total normal usage of letters.

As there are no open letters in New York Point, it follows that there is no hindrance from this cause as in Braille, and hence the use of a less number of either of these letters than normal in a story or list of test words, gives to Braille readers an advantage not shared by New York Point readers.

The peculiar treatment of this group of letters invites attention.

The open letter *m* in the first story is 50% less and in the second story 39% more than normal. The open letter *n* in the first story is 11% more and in the second story 35% more. The aggregate shortage of these difficult open letters, *m*, *n*, *p*,

s and *u* in American Braille is 26.60%, by which amount Braille readers were assisted, the net results being an equivalent disadvantage to New York Point readers.

The two point first base letter *i*, one of the three smallest and easiest letters in New York Point, is short in the two stories 36%, which was a serious disadvantage to the readers.

In American Braille *a* and *e* have only one point each, and are the easiest of all letters to read. The total normal number of these letters for the two stories is 240, while the actual number is 285, an excess of 45 letters, or 18.75%.

These letters in American Braille have one point each, thus giving 45 added points in the Braille stories for the surplus 45 letters.

In New York Point these letters have, respectively, two points and one point, making three, so that the excess of these 45 letters requires 135 points, which is 90 points, or 100%, more than in Braille. This is a handicap deliberately imposed upon the New York Point readers, by this departure from normal recurrence and fair practice.

As the number of times each letter appears is the same in both systems, it would seem that the advantages and disadvantages would be the same; but this appearance is deceptive, and it is evident that the procedure was deliberately designed to favor American Braille.

CONTRACTIONS.

All the useful facts about contractions were known many years ago, and there was no proper need to spend any time on the subject; however, the Committee had need for contractions, and on page 13 says:

"There appears to have been little or no question as to the wisdom of using contractions in the New York Point system, and all the signs of that system were therefore used in making one experiment, the result of which shows a much greater saving in time through the use of contractions. This is doubtless, in some measure, due to the uniform practice of using contractions in New York Point printing and the consequent unfamiliarity of the readers with full spelling."

Here we are indebted to the Committee for an important discovery which, in logical terms, may be stated thus:

A knowledge of contractions makes poor spellers.

Mary knows the sign for the word *that;* hence Mary doesn't know how to spell *that.*

Conversely: Ignorance of contractions makes one a good speller.

John knows nothing about contractions; hence John is a good speller.

In the first story there are 165 words, 109 of which permit contractions. This is an unnatural, highly technical composition, specially adapted to American Braille, but which was used for New York Point both capitalized and uncapitalized, and with full spelling.

For many years past the records of the Regents examinations show that the pupils at the New York School who have made constant use of contractions have attained a higher standard in spelling than pupils in the visual schools of the State.

According to the Committee, a still better record can be made by giving up contractions.

It is only just to say that the statement of the Committee is unwarranted and an unkind reflection upon the scholarship of blind people who read the New York system.

The only sheet of the first story in American Braille was with contractions, and hence any reading of the story in American Braille was in this contracted form.

The best average time was made by the first group, 94.7 seconds.

In New York Point this story was printed *without* contractions and with and without *capitals.* The best average time was made by the first group, 115.8 seconds. Total letters in first story, 655; American Braille contractions, 140; reductions by contractions, 184; letters and contractions used in this story, 471; number of letters used in writing story in New York Point, 655. The average elapsed time made by the first

group of readers on the first story in contracted American Braille was 94.7 seconds.

A simple calculation shows that at the same rate the story in American Braille with full spelling would have taken 131.65 seconds, as against 115.8 seconds, the average elapsed time made by the New York readers.

This is an unexpected result, but the same page of the Report furnishes a still greater surprise. In this case fifty American Braille readers who preferred contractions read it in this form; that is, with 471 letters and contractions, in an average of 89.9 seconds. At this rate these readers would have required 125.21 seconds to read the story printed with the full 655 letters.

The Committee apparently forgot to provide a similar reading in contracted New York Point.

It also appears that the result of the reading of this contracted story was incorporated with the other Braille readings in arriving at the average of elapsed time and errors, whereas the Report shows that the first story was *not* printed with contractions in New York Point, an omission unfavorable to the New York Point readers.

Only *one* contraction test paper was prepared in New York Point and British Braille, while 23 contraction lists were made in American Braille.

The contractions and the signs by which they are represented are unlike in the three systems, and yet the Committee pretends to show the value of contractions in British Braille and New York Point by contraction tests made in American Braille, which is absurd.

BILEVEL AND TRILEVEL STRUCTURE.

A comparison of bilevel with trilevel type will show that a certain number of bilevel signs can be made in each of the Braille letter spaces that would be exactly like the same letters in the New York system.

In British Braille the bilevel letters are *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i* and *j*, and form 46.88% of the total usage. In American

Braille the bilevel letters are *a*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *o*, *r* and *t*, and are 64.86% of total usage. In New York Point the corresponding letters made on first and second bases are *a*, *d*, *e*, *i*, *l*, *m*, *n*, *o*, *r*, *s* and *t*, and form 71.16% of all.

It will at once be seen that this bilevel practice is a great advantage in a trilevel system, and that the greater the number of these letters that were used in the Braille test, the easier they were to read; and the time for reading and the number of errors were correspondingly reduced.

In the two stories the excess of these letters over normal usage is 27%, which was a great advantage unfairly given to Braille readers.

A peculiar instance of the disregard of the law of recurrence is seen in the case of the troublesome open letter *s*. In American Braille the normal number of this letter for the first story is 45, while the actual number is only 33, a reduction of 12, or 26%.

I have always held and again reiterate that the trilevel structure is the prime cause of the insufficiency of any system employing this form of type, and it is my belief that any trilevel system incorporating the features of the New York system exemplified by its regular pitch for points and intervals, its series of base forms, the principle of recurrence and its code of symbols will still be inferior to the bilevel New York system for music, mathematics and literature in general.

In the analyses the explanatory notes are first given, then subject matter followed by the table of constituent elements in minute detail, in order to make clear the various factors that influence results.

On page 20 the Committee furnishes an example of its method of conducting a competitive test which will repay careful study. The test appears under the caption "What Dot System Now In Use Is Most Easily Read?"

In putting up this question the Committee ignored the cumulative experience of many years, and treating it as if it were a new one, furnished itself with the most novel means for its solution. These included two stories and a list of

eighty words, which were composed and compiled by the Committee for this purpose.

The stories each have 165 words and 655 letters, thus giving to the stories an appearance of equality.

Scanning these verbal textiles they reveal striking peculiarities which show that the appearance of similarity and equality was delusive.

The Report says that the first story was first printed in American Braille in full spelling and "*with* contractions *after* some of the schools had been visited."

In New York Point it was printed both with and without *capitals*.

The second story was printed in New York Point with and without *capitals*, and with *contractions*.

In American Braille it was printed with full spelling only.

In British Braille it was printed simply with contractions.

The list of eighty words was printed in New York Point and British Braille with contractions, uncapitalized; American Braille without contractions, uncapitalized.

A fair and just test required that the two stories and the eighty word list be printed in each system with full spelling, with capitals, without capitals, with contractions, and each in its own proper scale as an inherent element due to its structure, established by its author and recognized in general practice.

Moreover, these materials should have been provided before beginning the tests; but this was not done, and the Committee admits that the first story was printed in American Braille *with* contractions "*after* some of the schools had been visited."

No provision was made for the texts with the true New York scale 0.080 *before* the tests were begun, and the papers referred to on page 13 as "special sheets" are none other than the stories and the list of eighty words which had been prepared in the enlarged scale for other purposes.

THE READING TEST WITH TWO STORIES.

FIRST STORY.

Many years ago there lived in England a boy whose name was Dick. Dick's father and mother died when he was a baby, and the woman who took care of him was very poor. Sometimes he had no breakfast nor dinner, and he was often glad to get a crust of bread. In spite of this, Dick grew to be a very bright boy. He liked to listen when people were talking, and in this way he learned a great deal. He often heard the village people speak of London. They had never seen this great city, but they believed that all the streets were paved with gold and silver, that every one there was very rich, and that singing and music could be heard all the day long. One day a wagon drawn by eight black horses, with bells on their heads, was driven into the little town. Dick saw the wagon and thought that anything so fine must surely be going to London.

SECOND STORY.

The mice which haunted my house were not the common ones, but a wild, native kind not found in the village. I sent one to a noted naturalist, and it interested him very much. When I was building, one of these had its nest under the house, and would come out at lunch time and pick up the crumbs at my feet. It probably had never seen a man before; and it soon became quite tame, and would run over my shoes and up my clothes. It could climb the sides of the room like a squirrel. As I leaned with my elbow on the bench one day, it ran up my clothes, and along my sleeve and around the paper which held my dinner and played with it; and when I held still a piece of cheese between my thumb and finger, it came and nibbled it, sitting in my hand, and afterwards cleaned its face and paws, like a fly, and walked away.

While both of these stories are spoken of as "compositions" it should be observed that they are not examples of natural, ordinary English, but on the contrary are highly artificial; the first story having been constructed of words specially chosen to admit the use of as many American Braille contractions as possible, and a second story to admit a large number of English Braille contractions and a small number of New York contractions. The first story was printed with contractions in American Braille only. The second story was printed in New York Point and British Braille with contractions. In this way New York Point and British Braille could be compared while neither could be compared with American Braille. The artificial nature of Story No. 1 is favorable to American Braille and of the second story to British Braille, while both are unfavorable to New York Point.

The evidence of design in this violation of usual practice is furnished by the fact that certain letters are in excess while certain others are short of their proper proportion; the purpose and effect in either case being to give an advantage or impose a disadvantage upon the readers of one system or the other. This can be shown in the case of every letter, but a single illustration will suffice.

In normal practice there would be in the first story 52 letters *a*, whereas the actual number is 61, an excess of 9 letters which, with their letter spaces, requires 27 points and increases the finger travel of the New York reader 19% over normal. In some cases the actual use is less than normal, in which case the finger travel is reduced.

In Braille an open letter is one having one or two points at both upper and lower levels but no middle point. This broken structure hinders the reader and causes mistakes by the finger missing the lower points. As there are no open letters in New York Point, this tendency does not occur.

The aggregate shortage of open letters in the two stories is 18%, by which amount the Braille readers were enabled to make better time and fewer mistakes than if these letters had been used in normal ratio.

As there are no open letters in the New York Point system, the New York readers did not derive this advantage, so that the net result was adverse to them.

In each Braille system there are five one sided letters, the American Braille set being: *a*, *c*, *l*, *s* and *t*. The reader will notice that there is a shortage of *s* and an excess of each of the other letters.

Now why was the two point letter *s* reduced in both stories while the two point letter *t* and the three point letter *l* were increased in both stories ?

The letter *s* is an open broken letter.

The two points of the *t*, however, are adjacent, making the letter compact and easily recognized.

Similarly the three points of the letter *l* are adjacent, making it a unit and easily read.

Except the letter *s*, which has been reduced, the letters of this group—as compared with the others of the Braille family—are the simplest and easiest; and for this reason they have been drawn upon to make good the shortage of the other more difficult letters.

The two point letter *i*, one of the three shortest and easiest letters in New York Point, is short 18.62% in the two stories. The longer second and third base letters used to replace this shortage increases the finger travel of New York readers very greatly.

In the two stories the three point letter *r* should occur 69 times, whereas it appears 55 times, a shortage of 20.28%, which is made up by an excess of the one point letters *a* and *e*, which in American Braille are easily read and do not increase the finger travel; while in New York Point, the shortage is made up in part by the one point letter *e*, and in part by the two point letter *a*, which increases both the number of points and finger travel, thus imposing a disadvantage on New York readers.

In American Braille *h* is a two level letter having only three points and is easy to read. The New York *h* has five points, the maximum number, and is one of the three most difficult letters. In the two stories there should be 69 letters *h*, but there are 80, an excess of 11, or 16%.

This excess adds 33 points for the Braille readers, while the New York readers are given 55 points, a handicap of 22 points, or 67%, a very serious disadvantage.

In New York Point the letters vary in length from 1 to 4 points, so that a deviation from normal practice will have a decided effect upon finger travel.

In this case these added long letters carrying the highest number of points were substituted for shorter letters having a less number of points, the inevitable result being an unfair increase of finger travel and also of the tactile and mental effort required by the New York Point readers.

In American Braille the letters *j*, *q*, *x* and *z* have five points each and are difficult. In New York Point these letters are not specially difficult. In normal text the number of these

letters would be: j, 6; q, 4; x, 4; z, 2. In fact, however, excepting *q* used in the second story, these three difficult Braille letters were omitted from both stories.

The obvious design and effect of this juggle was to give the Braille readers the advantage of a larger number of the simple, easy letter *h* and to increase the finger travel and the mental effort of the New York readers by a larger number of one of the longest and most difficult letters; and further, to entirely relieve Braille readers from the difficulties presented by the complex and difficult letters *q*, *x* and *z*.

In the following table the *normal* figures show the number of each letter that should have appeared in a story of 165 words; the figures under *actual* show the number of each letter that did occur:

	FIRST STORY		*SECOND STORY*	
	Normal	*Actual*	*Normal*	*Actual*
a	52	61	50	53
b	11	15	11	14
c	19	11	18	20
d	26	37	25	41
e	70	88	68	83
f	26	9	25	10
g	12	21	11	5
h	35	45	34	35
i	52	38	50	45
j	4	0	4	0
k	6	10	6	5
l	26	29	25	29
m	18	9	18	25
n	44	49	42	57
o	47	44	45	35
p	12	8	11	10
q	3	0	3	2
r	35	34	34	21
s	45	33	43	28
t	51	56	49	50
u	22	7	20	23
v	9	11	8	6
w	13	22	13	17
x	3	0	3	0
y	12	18	12	16
z	2	0	2	0
	655	655	630	630

SUMMARY OF ANALYSES.

	First Story	*Second Story*
Number of words	165	165
Number of letters	655	630
Monosyllables	127	138
Dissyllables	36	21
Trisyllables	2	2
Polysyllables	0	4
Three letter words	38	41
Four letter words	40	32
Five letter words	32	24
Six letter words	14	13
Number of points in letters absent from New York Point	18	
Number bilevel letters American Braille	444	398
Normal percentage bilevel letters American Braille	64.86	64.86
Actual percentage bilevel letters American Braille	67.80	63.18
1st base letters, excess over normal	4.70%	6.52%
2nd base letters, excess over normal	1.25%	2.75%
3rd base letters, less than normal	6.20%	10.36%
Different contractions used in American Braille	29	
Total usage of contractions in American Braille	140	
Different contractions used in British Braille		32
Total usage of contractions in British Braille		117
Different contractions used in New York Point		15
Total usage of contractions in New York Point		62

LEVEL TESTS IN AMERICAN BRAILLE AND NEW YORK POINT.

The New York Point list 531 has 168 level letters *e*, *a*, *f*, *t*, *n*, *u* on two levels.

List 531, Letters *e*, *a* and *f*.

fence favor affront false fast affirm feast ease fat fag afflict fen fall earn afar fate east feel feet fault afraid farm affect fatal affair fact feeble after feature fable earnest fail effort fear face eagle fade fasten affix eager fare fangs eat faint fan efface feed fair fee ear

The American Braille List 561 has 50 level letters *a*, on one level.

List 561, Letter *a*.

back fad flash tan vast cant sat bland wall pat and draw fan want last past man lad all sand bad fall lag thrash ham saw flaw mass want rant bag small land blast pack shad mat ball brad drag tall wad paw shall bat mash band call pan hard

Total number of letters in New York Point list..... 234
Total number of letters in American Braille list.... 188

Excess of letters, and more work in New York Point 46
or 24.45%

Number of words in this test..... 50
Number of words beginning with a level letter in New York Point ..... .=50
or 100%

Number of words beginning with a level letter in American Braille .....= 2
or 4%

Excess in New York Point, and more work.....2400%

Monosyllables in New York Point..... 31
Monosyllables in American Braille.. 50

Excess in American Braille, and *less* work..... 19
or 61.29%

Dissyllables in New York Point 19
Dissyllables in American Braille 0
Excess in New York Point, and more work..... 19

Average number of letters per word in New York Point 4.68
Average number of letters per word in American Braille 3.76

Excess in New York Point..... ..... .92
or 24.5%

Words of three letters in New York Point..... 7
Words of three letters in American Braille 18

Excess in American Braille, and *less* work 11
or 157%

Words of four letters in New York Point 18
Words of four letters in American Braille 26

Excess in American Braille 8
or 44%

Words of more than four letters in New York Point 25
Words of more than four letters in American Braille 6

Excess in New York Point, and more work 19
or 316%

Percentage of easy one sided letters in the American Braille list 54.9
Normal percentage of these letters 38.8

Excess over normal 16.1
or 41.48%

Percentage of third base letters in New York Point list 28.20
Normal percentage of these letters..... ..... 26.00
Excess of third base letters, and more work 8.46%

NEW YORK POINT LIST 532, LETTERS *t, n* AND *u.*

tune unbolt undue unfurl tumult unbend unripe
nuisance unsafe tug untold tun unwind untwist
nurse unknown unit unbind tunnel unusual utmost
unite unfit unlock uncle tube unto unfed nun
ungodly unguarded unused tutor unfasten unique
utter unaided unless turn unstrung unfaded number
unfair union untrue uniform nutmeg unable nut
unseen

AMERICAN BRAILLE LIST 562, LETTER *e.*

drew blest led bend mesh went wed vest rent pew
set beg cell pest bell leg thresh shell flesh met
wend well send pet beck ten mess lest shed end
tell men lend hem sew flew cent bred pen fell
ell smell bed fen fed dreg blend bet peck herd

Total number of letters in New York Point list.....	285
Total number of letters in American Braille list	188
Excess in New York Point, and more work.....	97
or	51.5%
Monosyllables in New York Point	8
Monosyllables in American Braille	50
Excess in American Braille, and *less* work.....	42
or	525%
Dissyllables in New York Point.....	32
Dissyllables in American Braille.....	0
Excess in New York Point, and more work.....	32
Trisyllables in New York Point	9
Trisyllables in American Braille	0
Excess in New York Point, and more work.....	9
Words of more than three syllables in New York Point	1
Words of more than three syllables in American Braille	0
Excess in New York Point, and more work.....	1

Average number of letters per word in New York Point list.....	5.70
Average number of letters per word in American Braille list	3.76
Excess in New York Point	1.94
or	51.5%
Words of more than four letters in New York Point	41
Words of more than four letters in American Braille	6
Excess in New York Point, and more work.....	35
or	583%
Percentage of easy one sided letters in American Braille	54.76
Normal percentage of these letters	38.80
Excess over normal	15.96
or	41.13%
Percentage of third base letters in New York Point.	31.57
Normal percentage of these letters	26.00
Excess of third base letters, and more work....	5.57
or	21.42%

In the New York Point lists for level test, numbers 531 and 532, all the words, or 100%, begin with *one*, *two* or *three* level letters. In the corresponding American Braille lists, numbers 561 and 562, two words only, out of fifty in each test, or 4%, begin with *one* level letter.

In New York Point lists 531 and 532, *six* level letters occur in each test. In American Braille lists 561 and 562, only *one* level letter occurs in each test, of which fact the reader was notified.

Note also the fact that there is no letter *e* in American Braille list 562, and no letter *a* in list 561, which relieves the Braille reader of the troubles arising from ambiguity of these letters.

NEW YORK POINT LIST 533.

feet number fence unbolt tumult nuisance undue
unfurl favor afar fall feast false unite earn nut
unfit unlock uncle affair fen fact feeble feature

unbend unusual fat utmost fault farm affect fatal
fag effort fear turn fasten unstrung unfaded unfair
face unit affix union eager uniform untrue unable
fare fangs tutor nutmeg eat unbind fade fan faint
tube fair tune feed fee fast unknown feel unripe
efface ear unsafe after unseen unfed ungodly fable
earnest untold unwind fail nurse untwist fate ease
tunnel unguarded unaided afraid unique unless eagle
east affirm afflict affront utter unto tug nun unused
unfastened tun

American Braille List 563.

want land beck saw lest rant lend mess flew
shall ham mass end men small sew pack ten flaw
cent blast hem bag tell shed thrash pet lag fall
send well call bad wend sand all met flesh lad
shell man thresh past leg beg pest wand last back
cell hard fell brad bed wad band blend bat bred
ell mat drag fen paw pan mash bet pen ball
small tall fed dreg shad peck bell led tan sat
went pat rent herd fan fad bend vast wed draw
bland pew and set flash blest mesh cant vest
wall drew

Total number of letters in New York Point	519
Total number of letters in American Braille	376
Excess in New York Point, and more work	143
or	38.03%
Monosyllables in New York Point	39
Monosyllables in American Braille	100
Excess in American Braille, and *less* work	61
or	156%
Dissyllables in New York Point	52
Dissyllables in American Braille	0
Excess in New York Point, and more work	52
Trisyllables in New York Point	8
Trisyllables in American Braille	0
Excess in New York Point, and more work	8

Words of more than three syllables in New York Point	1
Words of more than three syllables in American Braille	0
Excess in New York Point, and more work	1
Average number of letters per word in New York Point	5.00
Average number of letters per word in American Braille	3.76
Excess in New York Point	1.24
or	32.97%
Words of more than four letters in New York Point	66
Words of more than four letters in American Braille	12
Excess in New York Point	54
or	450%
Percentage of one sided letters in American Braille.	54.76
Normal percentage of these letters	38.80
Excess over normal, and *less* work	15.96
or	41.13%
Percentage of third base letters in New York Point test	30.05
Normal percentage of these letters	26.00
Excess over normal, and more work	4.05
or	15.57%

In the New York Point test all the words, or 100%, begin with *one*, *two* or *three* "level letters." In American Braille only *4%* of the words begin with only *one* "level letter."

On page 11 of the Report the following statements are made: "These results show that in American Braille with block spacing, there was an increase of *17%* in time and *165%* in errors in the reading of the sheet where the reader had to determine the level for himself, over that required for reading the same thing when he was informed regarding the level.

"That in American Braille with the New York Point intervals, there was an increase of *12.3%* in time and *143%* in errors in reading the combined sheet.'

The important fact that there was an increase of *53.4%* in time and an increase of *35%* in errors in the reading of the tests with New York Point intervals over the reading of the tests with block spacing is *not* mentioned.

The following are the results given in the Report. Time and errors for tests in which the reader had to determine the level:

	Time, seconds	*Errors, per cent.*
Tests with block spacing	100.7	1.7
Tests with New York Point intervals	154.5	2.3

Increase with New York Point intervals, 53.4% in time and 35% in errors.

On page 11 of the Report the following statement is made: "From the above table it would seem that a capital prefix causes less hindrance to the reader than a fourth base capital letter."

The important point here is the admission that New York Point has true capital letters and is in perfect accord with grammar and with the customs of visual typography, while American Braille and British Braille have no capital letters, and in this respect are out of relation with correct usage. Furthermore, the acquisition of twenty-six capital formations involves mental and tactile discrimination, while a capital sign adds no discipline and imparts no knowledge.

The development of mental and tactile power resulting from the study of New York Point capitals is, in itself, a natural and important educational factor. The New York Point capitals present no unusual difficulty and are used with the same facility as the small letters.

In preparing these capital tests the Committee knew that in reading them the New York readers would be required to make twenty-six times as much effort as the Braille readers.

On page 13 the Committee says:

"There appears to have been little or no question as to the wisdom of using contractions in the New York Point system, and all the signs of that system were therefore used in making

one experiment, the result of which shows a much greater saving in time through the use of contractions. This is doubtless, in some measure, due to the uniform practice of using contractions in New York Point printing and the consequent unfamiliarity of the readers with full spelling."

It is well known that the practice of shorthand, in any form, is attended by an enlarged and more exact knowledge of words, and hence results in greater familiarity with spelling, instead of unfamiliarity, as erroneously stated in the report.

Again, it is obvious that if contractions are a cause of unfamiliarity with correct spelling, the greater number of poor spellers from this cause will be found among the readers of those systems in which contractions are most freely used.

It is well known that contractions regularly used in each of the Braille systems is greater than in books printed in the New York Point system, and hence, according to the premise laid down by the Report, greater unfamiliarity with correct spelling will be found among readers of the Braille systems than among readers of New York Point.

The general proposition that time will be saved by the use of contractions is subject to an exception when their use involves the rupture of diphthongs, digraphs, syllables and words. This practice has always been forbidden in New York Point, but has been extensively followed in Braille.

Before leaving this item, it ought to be pointed out that the statement that readers of New York Point are unfamiliar with spelling, which was adopted and published by the committee and the Association of Workers for the Blind, is an unwarranted and unkind reflection upon the scholarship of users of the New York Point system; and the impropriety will not be palliated by the fact that the subject of spelling was not within the purview of the Committee, whose Report makes no reference to it other than that above quoted.

On page 13 the Report says:

"In order to test the relative legibility of types different in size or scale, special sheets in New York Point and American Braille were prepared."

New York Point special sheets	5
American Braille special sheets	4
New York Point readers of special sheets	41
American Braille readers of special sheets	19

Results of reading—page 14:

	Time, per ct.	*Errors, per ct.*
New York Point list 731, large type	100	100
New York Point list 731, small type	111	90
American Braille list 761, large type	100	100
American Braille list 761, small type	125	200
Increase in time in New York Point	11	..
Increase in time in American Braille	25	..

Excess of increase in time of American Braille over New York Point	127%
Decrease in errors in New York Point	10%
Increase in errors in American Braille	100%

This proves that a smaller scale is adaptable to the horizontal construction but not to the vertical construction.

The use of 100% instead of actual figures for time and errors in comparing the reading of the enlarged type and the normal type was evasive. If the actual reading time for the large 0.090 scale was, in fact, less than the reading time for the true 0.080 scale, why were the actual figures not used instead of the meaningless percentage statement given in the report?

THE SPACING QUESTION.

The list with which this test was made contained 100 words; 77% of these words were monosyllables, 23% were dissyllables.

Easy one sided letters in this test	56%
Normal percentage	37.1
Excess over normal	48%

A page of composition from the Report shows the following contents, which afford a striking contrast between natural usage and the artificial structure of the tests:

Total number of words	749
Number of monosyllables	476, or 63%
Number of dissyllables	134, or 17.8%
Number of trisyllables	139, or 18.5%

"ARE CHARACTERS OF FEW DOTS EASIER TO READ THAN CHARACTERS OF MANY DOTS?"

British Braille List 201.

bcakk	cbaa	ebck	idfi	eie	abei	acce
kbabk	kic	ijeh	cabc	eek	ilba	akbek
cimi	abi	elac	kieo	ckae	bckbi	biek
kaeb	eaoc	ais	kcbci	bebk	scu	iaib
ackea	keci					

New York Point List 231.

asie	oem	ilear	ieao	svey	epo	esde
fceo	epyev	seoa	eira	elim	eoeis	aec
feds	oepy	evs	eoae	irae	meoei	isae
cfe	dseas	ieoe	meli	arie	aoe	svey
peosd	efc					

One point and two point letters in British Braille	90%
One point and two point letters in New York Point	70%
Excess in British Braille	20
	or 28%

	Per cent.
Normal recurrence in British Braille	32.07
Excess over normal	180
Normal recurrence in New York Point	40.4
Excess over normal	73
Other letters in British Braille list	10
Other letters in New York Point list	30
Excess of other letters in New York Point	200%
Number of different letters in British Braille list	15
Number of different letters in New York Point list	14

British Braille List 203.

jon	tqdu	szvfm	lgwp	hxry	pjuvn	xrym
qstl	gzo	hfwd	qxpv	lumd	tynow	jfz
hsgr	touqv	dpsj	rznl	wmxh	gfy	tmds
wxp	hljv	rnoqy	gzuf	smpw	hjq	xdzfn
uolt	yrgv					

NEW YORK POINT LIST 233.

lsyi	ofg	bdmzz	xhqh	kxpv	rigc	odm
zxhz	lsyiq	hvrj	fbgc	kxpa	zhl	irbka
dxhy	vfcp	omzs	qjgx	yhz	mcrgd	klfh
xsp	qjzo	vxbai	boqk	gzi	xzsph	dchf
avjx	rmyl					

Per cent.

Recurrence value of letters in British Braille list..... 29.81
Recurrence value of letters in New York Point list.... 11.74
Excess of recurrence value of letters in British Braille list..... 154%

Number of five point letters in New York Point list. 30
Number of five point letters in British Braille list... 12

Excess of *five point* letters in New York Point list 18
or 150%

In British Braille list, the letters with the greatest number of dots represent only 10% of all the letters.

In New York Point list, the letters with the greatest number of dots represent 25% of all the letters.

In British Braille list 201, number of different letters..... 15
In British Braille list 203, number of different letters..... 20

The difference in the number of different letters in the two British Braille lists..... 5

In New York Point list 231, number of different letters... 14
In New York Point list 233, number of different letters... 21

The difference in the number of different letters in the two New York Point lists..... 7

This proves that the difference between the two New York Point lists is *40%* greater than the difference between the two British Braille lists.

AMERICAN BRAILLE LIST 263.

lxrwk	hgv	fxoj	dgwk	cjiv	yjbj	kwrxl
vgh	joxf	kwgd	vijc	jbjy	vgw	xidkh
jrwg	cjxy	jolk	bfjv	wgv	hkdix	jrwgy
xjc	kloj	vjfb	kojw	bnvj	lxg	jyrm
xgikp	jwvu					

The following analysis shows the features of this list:

The letter *j* occurs twenty times, while the letters *q* and *z* (both letters with many dots) *do not occur at all.* It will be remembered that in the corresponding New York Point list 233, there are 30 five point letters.

In the American Braille list 262 the three point letter *l* occurs twenty-four times, while the difficult three point open letters *m, n, p, u* occur only *once* each.

BRITISH BRAILLE LIST 213.

lake	came	bad	jack	ice	fake	bail	sail	laid	lad
aim	take	calm	aid	ale	said	milk	kick	bale	
cat	meek	lace	am	see	lack	bee	beau	abide	
be	abate	ace	sea	cake	abase	click	bade	lamb	
kid	blade	oak	back	alas	cab	kale	ease	base	
ail	case	face	bake	ask	make	black	cask	sack	
sake	balm	coal	sail	cause	sofa	blame	amid		
blue	soak	same	abuse	safe	slack	sad			

BRITISH BRAILLE LIST 214.

noon	pry	gray	go	boy	spot	yawn	prop	copy	
dry	pump	hurry	fry	prey	try	prose	tax	pomp	
joy	spy	fuzzy	gay	pivot	frog	pond	drug	spry	
hung	dray	rug	trip	lung	turn	sung	plug	grip	
well	grit	tune	put	troop	worn	no	wild	root	
toll	buy	pony	roll	told	quote	gold	wool	tilt	
tell	say	wilt	room	ply	yes	rope	blunt	write	
fox	draw	floor	royal	wire	toy	duty			

NEW YORK POINT LIST 241.

so	one	seed	none	wise	less	seen	is	lie	seem
nine	seven	fine	need	nice	die	me	pie	fee	
nose	feed	wine	sever	cone	weed	noon	foe	men	
deed	pen	sense	pose	severe	rose	son	reed	sin	
yes	scene	oven	eye	rise	sinner	even	done	ore	
woe	dine	ode	side	sleeve	dose	lone	ice	new	
line	sew	on	peer	in	we	reef	see	does	send

NEW YORK POINT LIST 242.

ox hop ugly ax hog kick hip hang jump fox
howl lazy hawk gum by him half mug job my
his bag jug hold buzz dizzy bulb hill bug up
box hung fuzz go jig wax foxy gaze waxy hazy
jury how luck bowl lurk quick dazzle happy hack
bulk hall bump hub grub hum hook black hark
wizard hug hump hymn hurl hull hungry

The British Braille list 213 and the New York Point list 241 were made the basis of comparison, the time which is taken to read them and the errors made in reading them is represented by 100%. The difference between the two New York Point lists is much greater than between the British Braille lists.

British Braille list 214 has 54 one point letters less than British Braille list 213.

New York Point list 242 has 78 one point letters less than New York Point list 241.

Excess in decrease of one point letters in New York Point, 44.44%.

British Braille list 214 has 25 four point letters more than British Braille list 213.

New York Point list 242 has 46 four point letters more than New York Point list 241.

Excess in increase of four point letters in New York Point, 84%.

Recurrence value of the letters in British Braille list 214, 27.41%.

Recurrence value of the letters in New York Point list 242, 24.94%.

Excess of recurrence value of letters in British Braille list, and consequent greater familiarity of the reader with these letters, 9.9%.

Increase in number of points in British Braille list 214, 67%.

Increase in number of points in New York Point list 242, 76%.

Excess in increase of points in New York Point, 13%.

In the British Braille list 214, where the letters with many dots are tested, the letter *q*, which has five dots, occurs only

once; the five dot letter *y* occurs 24 times; total five point letters in the British Braille list, 25.

In New York Point list 242, which corresponds to the British Braille list 214, there are 46 five point letters; *h* occurs 27 times, *x* 7 times, and *z* 12 times.

Excess of five point letters in New York Point list, 84%.

ARE CHARACTERS SIMILAR IN SHAPE MORE EASILY READ IF PLACED VERTICALLY IN A TRILEVEL LINE, OR HORIZONTALLY IN A BILEVEL LINE?

In this test, the list 312 in British Braille and the list 342 in New York Point were taken as the basis of comparison.

British Braille list 316 and New York Point list 346 were compared with the above lists.

The letters in British Braille list 316 represent 27.16% of the letters in *normal* usage.

The letters in New York Point list 346 represent only 11.67% of the letters in *normal* usage.

This shows that the familiarity of the British Braille reader with the letters was correspondingly greater than that of the New York Point reader with the letters in his list.

With this advantage for the British Braille reader the time taken by him is only 7% less than the time taken by the New York Point reader, and the *New York Point reader* makes 5% *less* errors.

When a group of dots in the second list had more than one value in the New York Point alphabet, the letter of less frequent recurrence was used.

Examples:

Recurrence value of *v*, 1.3%.

Recurrence value of *y*, 1.9%.

The letter *v* was used, its recurrence value being *46% less* than that of *y*.

Recurrence value of *h*, 5.4%.

Recurrence value of *z*, 0.25%.

The letter *z* was introduced; its recurrence value being *2060% less* than that of *h*.

On page 17 the Report says:

LEGIBILITY.

"In estimating the fitness of any system to serve as the uniform type of the future, some knowledge of the relative legibility of the letters of its alphabet is very desirable. To obtain this a set of test lists was prepared for each of the three punctographic alphabets. . . . Each list contained 160 letters, of which 104, made up of four of each letter of the alphabet, formed a sort of background, common to all the lists. The remaining 56 letters on each sheet were the letter or letters to be tested. . . . In American Braille and New York Point, the lists contained 160 letters, 100 of which formed the common background, while the remaining 60 were made up of the letter or letters to be tested. It was thought best to test the equivocal characters separately, so *e* in American Braille, and *t*, *n* and *u* in New York Point, were not used in the background. The omission of one letter from the 26 of the alphabet gave just the 100 for the background, and in New York Point, the omission of the other two letters was made up by putting in more of *e* and *a*.

The alphabet test was read by 53 English Braille readers, 61 American Braille readers and 59 New York Point readers."

Without going into the subject at length, the following points may be noted:

The principle of recurrence has practically settled the question of legibility for any system in which that principle is applied. It divides letters into classes and gives to each from one to five points according to its class; in New York Point it arranges the letters on four base forms; in American Braille it indicates the one sided and the open letters, and these are the inherent elements of legibility.

In British Braille the principle is not applicable, and hence the imaginary background, or any other means of determining the relative legibility of letters in British Braille, is at variance with the principle on which the alphabets in New York Point and American Braille have been arranged.

In British Braille the background comprises 104 letters, while in American Braille and New York Point it had only 100 letters. The omission of the letters *t*, *n* and *u* from the New York Point background, upon the assumption that they are equivocal, was unwarranted, especially as the report states

that the tests on level letters indicate "that the characters which are alike, except for their position in the line, are but little, if any, hindrance in reading New York Point."

BRITISH BRAILLE LIST 403. AMERICAN BRAILLE LIST 464.

Number of test letters in British Braille list is 60, of which 16, or 26.6%, occur in fixed order.

Number of test letters in American Braille list is 64, of which 8, or 12.5%, occur in fixed order.

BRITISH BRAILLE LIST 404. NEW YORK POINT LIST 435. AMERICAN BRAILLE LIST 465.

Number of test letters in British Braille	60
Number of test letters in New York Point	64
Number of test letters in American Braille.....	64
Excess of test letters in New York Point and American Braille over British Braille.....	6.66%
Number of test letters occurring in fixed order in British Braille	16
or	26.6%
Number of test letters occurring in fixed order in New York Point.....	2
or	3%
Number of test letters occurring in fixed order in American Braille.....	6
or	9%

By giving less test letters and more letters in pairs to British Braille than to New York Point and American Braille, the Committee gave the British Braille readers a great advantage over the other systems.

BRITISH BRAILLE LIST 408. NEW YORK POINT LIST 440.

Number of test letters in British Braille list.....	64
Number of test letters in New York Point list	70
Excess of test letters in New York Point list ...	9%

NOTE: *e*, *f*, *k* and *x* are omitted once each; *b* and *h* are added once.

BRITISH BRAILLE LIST 409. NEW YORK POINT LIST 441.

Number of test letters in British Braille 64
Number of test letters in New York Point 69
Excess of test letters in New York Point..... 7.8%

NOTE: *d*, *i* and *z* are omitted once each; *c* and *j* are added once.

BRITISH BRAILLE LIST 410. AMERICAN BRAILLE LIST 472.

Number of letters tested in British Braille 64
Number of letters tested in American Braille 76
Excess of letters tested in American Braille.... 18.7%

BRITISH BRAILLE LIST 412. NEW YORK POINT LIST 443.

Number of letters tested in British Braille 60
Number of letters tested in New York Point 74
Excess of letters tested in New York Point..... 23%

BRITISH BRAILLE LIST 413. AMERICAN BRAILLE LIST 474.

Number of test letters in British Braille list..... 60
Number of test letters in American Braille list 64
Excess of test letters in American Braille list... 6.6%
Number of test letters occurring in fixed order in British Braille 16
or 26%
Number of test letters occurring in fixed order in American Braille 8
or 12.5%

BRITISH BRAILLE LIST 415. NEW YORK POINT LIST 445. AMERICAN BRAILLE LIST 476.

Test letters in fixed order in British Braille 18.7%
Test letters in fixed order in American Braille..... None
Test letters in fixed order in New York Point..... None

BRITISH BRAILLE LIST 416. AMERICAN BRAILLE LIST 475.

Number of test letters in British Braille..... 64
Number of test letters in American Braille..... 68
Excess of test letters in American Braille 6%
Test letters in fixed order in British Braille..... 12.5%
Test letters in fixed order in American Braille ..... None

BRITISH BRAILLE LIST 419. NEW YORK POINT LIST 448.

Number of test letters in British Braille list 60
Number of test letters in New York Point list..... 68
Excess of test letters in New York Point list ... 13%
Test letters in fixed order in British Braille 33%
Test letters in fixed order in New York Point ..... None

BRITISH BRAILLE LIST 420. NEW YORK POINT LIST 447.

Number of test letters in British Braille list 60
Number of test letters in New York Point list 64
Excess of test letters in New York Point list ... 6.6%
Test letters in fixed order in British Braille..... 20%
Test letters in fixed order in New York Point 3%

The reading of these test papers by 173 readers simply showed 173 rates of reading for each letter in each system, dependent in part upon the arrangement of the letters as determined by the principle of recurrence, in part by the fixed order of letters, and in still larger part on the capacity of the readers.

THE IMPORTANCE OF ECONOMY IN EMBOSSED LITERATURE.

In the administration of ordinary business affairs, economy in every matter that affects cost is everywhere regarded as a most important element of efficiency, and a careful manager will split a cent on the price of a ton of coal, and put value on a minute in the matter of shop cost. There seems, however, to be an observable tendency to regard these considerations as negligible in regard to embossed literature.

Indeed, the rule that goods and supplies of a given grade and serving the same general purpose shall be purchased at the lowest offered price is generally disregarded with respect to embossed books.

Very much might be written on the various phases of the subject as presented in the three systems considered in the Report, but the final conclusion in which all conditions that

influence the matter are embodied, may be seen in any book large enough to include all such considerations; and the Bible, which is perhaps better known than any other book, furnishes an actual and convincing illustration.

For example, this book can be supplied at the following different rates of cost per copy: $11.00, $22.00 and $34.00. The price of $22.00 (New York Point, single side, weight, 74 pounds) was the result of an effort to reduce the cost, which had been $32.00 (Boston Line), and it resulted in a reduction of 31.25%. The price of $11.00 per copy (New York Point, two side, weight, 39 pounds) is also the result of an effort to reduce cost, and so increase the output, without increase of capital; the reduction here is 50%. The price of American Braille (single side, weight, 110 pounds) is $34.00.

Reason and sound policy require that the manufacture and purchase of embossed books shall be regulated by the usual rules of business and economy.

It may be objected that embossed books should be exempted from this prudent practice because of their technical character, and because trustees, principals and fiscal agents necessarily know little about the subject.

In this respect, however, embossed books do not differ from coal, butter, textiles, coffee, tea, flour and other articles of everyday use, about which officials, charged with their purchase, generally have little or no specialized knowledge, but who, nevertheless, make purchases of these articles at the lowest price offered by responsible parties.

Correct business practice in this matter would tend greatly to settle the question of uniformity, for obviously, only the most economical system would eventually hold the field; and, from the facts set out in these pages as gleaned from the Report, it is clear that *that* system will *not* be British Braille, American Braille, London Point, Standard Dot *nor any other trilevel system.*

WILLIAM B. WAIT.

New York, June 10, 1915.

NSH # 20150

END OF
TITLE